

REMARKS

This amendment is in response to the Office Action mailed December 20, 2005. Claims 2-8 have been amended.

On page 3 of the Office Action, the Examiner objects to the title of the invention as being "not descriptive." A new, more descriptive title has been submitted.

On page 4 of the Office Action, claims 2-8 have been objected to because of numerous informalities. Claims 2, 4 and 7 have been amended to recite that the magnetoresistance effect element is laminated on a substrate. The phrase "a generally square shape" has been replaced with "a substantially square portion of." The word "perpendicular" has been added to more clearly define which centerlines the applicant is claiming. Finally, the components of the magnetoresistance effect element has been recited in Claims 2, 4, and 7. Numerous antecedent basis problems have been corrected. In claim 2, the magnetoresistance effect elements are provided "on the substrate" rather than "in a single plane," to clarify how these elements are provided.

Pages 5 and 6 of the Office Action, the Examiner rejects claim 4 under 35 U.S.C. §112, first paragraph as failing to comply with the written description requirement. In the rejection, the Examiner noted that the pinned layer direction was in the negative X-axis direction from Figure 42, and requested support for a broader version. It is respectfully submitted that Figure 57 discloses pinned layers in both the negative and positive X-axis directions. In addition, pages 28 to 30 and Figures 50 through 57 disclose how the magnetic sensors are produced according to the third embodiment of the present invention. In addition, the disclosure from line 18 of page 31 to line 2 of page 32 summarizes the third embodiment which includes the magnetic sensor 60 shown in Figure 42. These disclosures do not limit a magnetic sensor to the magnetic sensor 60 shown in Figure 42. From these disclosures, it is clear that a

magnetic sensor has first element with a pinned layer in either direction of the X-axis. One with ordinary skill in the art would understand from these disclosures that the first element's pinned layer can be in the positive direction of the X-axis. The Examiner is respectfully requested to withdrawn this rejection.

In paragraphs 7 and 8 of the Office Action, the Examiner rejects claims 2 and 4 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claimed the subject matter which Applicant regards as the invention. In particular, the Applicant used such phrases as "generally square shaped," "in the neighborhood," "a little below," "generally central part of the chip," and "a little above." Applicant has amended claims 2 and 4 to eliminate such unclear and indefinite phrases.

In paragraphs 9 and 10 of the Office Action, claims 2-8 are rejected under 35 U.S.C. § 102 (e) as being anticipated by International Publication No. WO 00/79298 to Adelerhof et al. (Adelerhof). The Examiner's rejection on this ground is respectfully traversed.

Among the limitations of independent claim 2 that are neither disclosed nor suggested in the art of record is that the sensor comprises magnetoresistance effect elements "on a substantially square portion of a substrate," that such sensors are "provided on the substrate," and that the elements are placed "symmetrically with respect to perpendicular center lines" of the portion. Among the limitations of independent claim 4 which are neither disclosed nor suggested in the art of record is the requirement that the eight magnetoresistance effect elements are provided "on a substantially square portion of a substrate." Among the limitations of independent Claim 7 which are neither disclosed nor suggest in the art of record is the requirement

that the magnetoresistance effect elements are "laminated directly on a single substrate on a single chip."

Adelerhof discloses in Figure 10 a substrate having four elements placed in a non symmetrical fashion on a single rectangular substrate. This placement is not symmetrical as explicitly required by claim 2 and the substrate is not substantially square as required by claims 2 and 4. In order to provide a magnetic sensor having double full bridges for 360 degrees of magnetic angle detection, eight elements are required. The pinned magnetization direction of two elements should be in a positive Y-axis direction. There should be additional pairs of elements having pinned magnetization directions in a positive X-axis direction a negative X-axis direction and a negative Y-axis direction. However, as shown in Fig. 10 a first element has a magnetization direction in the positive X-axis direction, the second and third elements are pinned in the positive Y-axis direction and a fourth element is pinned in the negative X-axis direction. These four elements are connected together to form a closed loop. Such a loop cannot be configured into a full bridge. Alternatively, such chips could be stacked together to create two full bridges as shown in Adelerhof Fig. 6 and 7, and described in page 19, line 3 to page 20, line 5. Adelerhof Fig. 11 illustrates a 3 x 4 matrix configuration that includes 12 devices (6 in a configuration of Fig. 10 and 6 in the mirror image of Fig. 10) in total. As disclosed in page 10, line 34, to page 11, line 13, these devices are created in a multi-layer configuration building further on the basic TMR stack of the device. Such a stacked device is not laminated directly on a single substrate, but is stacked in order to create a magnetic sensor. See Adelerhof Fig. 7. While the Office Action points to 8 elements depicted in the marked up Figure 11, these elements from the 3 x 4 array are not arranged on a substantially square portion of the substrate. Adelerhof does not disclose connecting these elements together to

form a sensor. The absence of any disclosure or suggestion of these features of the invention, independent claims 2, 4 and 7 are believed to be in condition for allowance.

Claims 3, 5, 6, and 8 dependent from independent claims 2, 4, and 7 and include all the limitations found therein, and are also allowable for at least the same reasons stated in connection with the independent claims. These dependent claims include further limitations, which, in combination with the limitations of the independent claims are neither disclosed nor suggested in the art of record.

In paragraphs, 12 and 13 of the Office Action, claim 7 and 8 are provisionally rejected under 35 U.S.C. § 101 as claiming the same invention as that of claims 11 and 12 respectively of co-pending U.S. Patent application No. 10/846,554. Both the instant application and co-pending application No. 10/846,554 are divisional patent applications of parent U.S. patent application No. 10/052,525. Applicant will address this provisional rejection when one of these applications are allowed.

In paragraphs 14-19 of the Office Action, Claims 2-6 are provisionally rejected on the grounds of non-statutory obviousness-type double-patenting as being unpatentable over claims in co-pending application No. 10/846,554. An appropriate Response will be submitted should any of Claims 2-6 become allowable.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application issue.

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Respectfully submitted,

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